



BASIC GUIDELINES ON WHEN TO REMOVE A PLAYER FROM THE FIELD OF PLAY FOLLOWING A FOOT AND ANKLE INJURY

Dr Chris Narramore

207 Constantiaberg Medi-clinic, Burnham Road, Plumstead
And Sports Science Institute, Boundary Road, Newlands

Tel: 27 21 762 5228
Fax: 27 21 762 5229



Providing coaches, referees, players, and administrators with the knowledge, skills, and leadership abilities to ensure that safety and best practice principles are incorporated into all aspects of contact rugby.

INTRODUCTION

Research data indicates a variable incidence of rugby injuries in schoolboy and professional rugby players (2, 4). However, approximately 50 % of all injuries involve the lower limb, of which about 15% make up foot and ankle injuries (1). There is a higher incidence of foot injuries in players with rigid feet although the overall sporting performance is better in players with these type of feet (6).

ANATOMY

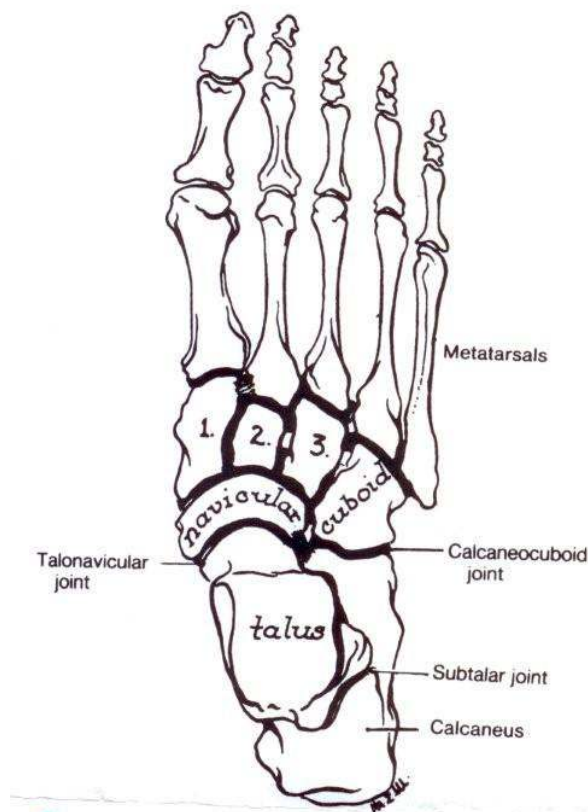


Fig. 1: Bones of the foot and ankle

(Clinically Orientated Anatomy, Second Edition, Keith L. Moore, Page: 549)

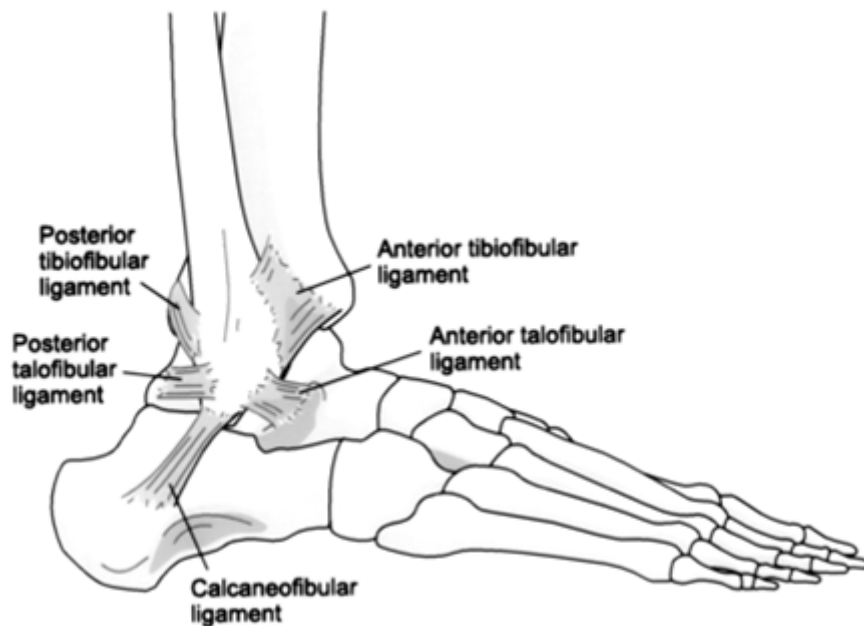


Fig. 2: Main ligaments of the foot and ankles

The Foot

The foot is divided into three parts: the forefoot, mid foot and the hind foot:

Forefoot

Metatarsals and phalanges comprising of 21 bones and 21 joints.

Mid foot

Cuboid, navicular and 3 cuneiforms, comprising of 5 bones and 10 joints.

Hind foot

Calcaneus and talus and a subtalar joint comprising of 2 bones and 1 joint.

Between each bone and joint there are main ligaments, plus additional ligaments. Foot includes 15 foot muscles with 10 extrinsic muscles contributing to 16 tendons.

The Ankle

The ankle is made up of 2 joints (tibia talar joint and distal syndesmosis), the very important lateral and deltoid ligaments as well as the ligaments of the syndesmosis.

The Foot and ankle

The foot and ankle make up together a TOTAL of 31 bones and 34 joints. Therefore the number, type and variations of injuries will far exceed that occurring in the knee or shoulder.

Some of the more common injuries will be discussed.

FOOT AND ANKLE INJURIES

Bones:

Ankle Fractures

Occur with rotational injuries during a tackle or scrum collapse.

The fibula develops a spiral fracture with external rotation at the ankle joint (Weber B) or more proximal (Weber C). With forced inversion a transverse fracture of the fibula occurs (Weber A) with or without oblique fracture of the medial malleolus. In the ankle of a growing player we see epiphyseal injuries. Sprains usually do not occur in the immature ankle. What looks like a sprained ankle is a growth plate injury usually of the tip of the fibula with minimal or no displacement

Metatarsal and Phalangeal Fractures

The most common fracture occurs in the fifth metatarsal base from an inversion injury. Metatarsals 1-4, which are fractured either from a forced dorsiflexion injury with twisting or when a rugby player lands directly on someone's foot with his studs. This also results in phalangeal fractures. Navicular, anterior process calcaneus and cuboid fractures also occur but are more common in soccer players.

Ligaments:

Lateral ligament

The most common injury around the ankle is the lateral ligament injury of the ankle, which involves either the anterior talar fibula ligament (ATFL) or the calcaneal fibula ligament (CFL). It is often associated with a sprain of the anterior syndesmosis ligament (anterior distal tibia fibula ligament - ADTFL).

Deltoid ligament

These normally occur with ankle fractures, but can occur in isolation. The deltoid ligament is sometimes associated with spring ligament injury. Two additional ligaments of the foot which may be injured during a rugby match are the Lisfranc ligament between the base of the second metatarsal and medial cuneiform,

and the spring ligament, which are an extension of the deltoid ligament and an important supporting structure of the arch of the foot.

Tendons:

Achilles Tendons

The commonest tendon injury is that of Achilles tendon. This occurs either when the scrum collapses and the foot is forced into dorsiflexion, or as a result of a sudden explosive sprint which occurs more in older rugby players.

Peroneal Tendons

Usually a split of peroneus brevis at the tip or proximal or peroneal groove behind the fibula. Often a missed injury at first as it occurs with ankle sprains.

Joints:

The most common dislocations seen with foot injuries are dislocations of the small joints of the toes (inter phalangeal joints), in particular the proximal inter phalangeal joints. These are less common in rugby due to the fact that the foot is well protected within the rugby boot. Dislocations of the subtalar joint, where the whole foot and heel either moves inwards or outwards are the most serious. The whole foot dislocates, excluding the talus. These are fortunately rare but severe injuries.

MECHANISM OF INJURIES

Most of the injuries in the lower limb are caused during contact and/or tackles, or during rucks and mauls. The ankle has the highest incidence of injury in the foot and ankle area, accounting for 75% of all foot and ankle injuries. The most common injury is the lateral ligament sprain, which occurs with inversion injuries of the foot. Variable severity occurs, from a mild sprain of the anterior talar fibula ligament (ATFL) to complete disruption of the ATFL and CFL, which is classed as a grade 3 tear of the lateral ligaments.

During tackles and with rotation, the inner side of the ankle (medial malleolus) and outer side of the ankle (lateral malleolus) undergo twisting injuries, resulting in fractures to both. If the medial side of the ankle does not fracture, the deltoid ligament sometimes tears. This results in a completely disrupted ankle joint. A forced plantar flexion injury of the foot occurs during a scrum collapse. The foot is forced and crushed into dorsiflexion; this results in a Lisfranc injury (metatarsal tarsal injury).

ASSESSMENT OF THE INJURED FOOT AND ANKLE

Examination of an injured player in the more severe injuries will reveal obvious deformity where the foot is displaced inwards or outwards. Any movement of the foot may reveal crepitus or a grating feeling due to a broken bone (i.e. a fracture).

In dislocation there will not be a grating feeling, although there will be significant deformity in the sub talar dislocation, where the whole foot will be pushed outwards or inwards.

These are the most severe types of foot and ankle injuries. On occasion the fracture of the ankle may be so severe that the bone may penetrate through the skin with obvious bleeding. . This is an orthopaedic emergency and the patient has to be taken to hospital as soon as possible for cleaning of the wound, to prevent infection.

Should there be no obvious mal-alignment and deformity of the foot and ankle, the boot will need to be removed. A complete tear of the lateral ligament, which is a common injury, is associated with swelling within the first 5 minutes. This starts as a golf ball type swelling over the anterior lateral part of the ankle joint.

The ruptured Achilles tendon is one of the most often missed injuries of the foot and ankle. Although a loud snap may be heard during the game when this injury occurs, there is often minimal pain. The player will also be aware of the feeling of something snapping or breaking in the ankle area. After removal of the boot, a gentle feeling around the ankle will identify the area of tenderness. This will normally be associated with a feeling of a defect in the back of the ankle over the Achilles tendon. This soon fills up with blood and after a day or two it is difficult to feel the defect. Any tenderness and swelling in the mid foot, especially on the lateral border of the foot, is often associated with 5th metatarsal fracture.

Deformity of the toes is normally due to dislocation or phalangeal fracture. Direct traction in the line of the toe will often reduce a dislocation of the IP joint with pain relief. A player would be able to continue playing if he straps the toes together, as this reduces pain. However, if there is a deformity associated with a fracture, traction on the toe, which is unable to be realigned, may exacerbate the pain.

GUIDELINES ON WHEN TO REMOVE A PLAYER FROM THE FIELD

This decision is normally more easily made in the case of a foot and ankle injury compared to the shoulder, as most rugby players with a significant injury will not be able to run or jump, and therefore not be able to continue playing.

An obvious deformity of crepitus or bleeding around the ankle as mentioned is a medical emergency and requires immediate transfer to hospital. After removal of the boot, the deformity in the foot observed means the player needs to be removed from the field and transferred to a hospital emergency unit or referred to an orthopaedic surgeon and X-rays.

As mentioned, a dislocation of the toes which is reduced on the field, can be managed and the player may be able to continue playing. The two adjacent toes can be strapped with zinc oxide tape. Should a fracture be present in one of the toes or metatarsals, a player will be unable to run or walk on the foot without severe pain unless it is an undisplaced crack fracture. Even in that situation any twisting or sudden change of direction or course will cause severe pain and the player will be unable to continue playing.

When assessing an ankle for an injury, be aware that severe swelling implies significant tearing of ligaments or a fracture. The ankle may look straight but with gentle movement inwards will feel unstable and be able to bend inwards more than the uninjured ankle. This indicates complete tearing of the lateral ligaments. This movement will often be less painful than a partial tear. In a complete rupture there is often less pain than when there is a partial tear of the ligament. If this is present the player needs to be removed from the field.

FUTURE MANAGEMENT OF FOOT AND ANKLE INJURIES

Players need to be referred to a facility where there are X-rays available and where patients can normally be referred on to an orthopaedic surgeon should there be an indication for further management in the form of a fracture or complete dislocation.

It is essential that a diagnosis be made and committed to, as some of the soft tissue injuries of the foot and ankle are not diagnosed and lead to later deformity of the foot. Any severely swollen foot and ankle with a normal X-ray requires an orthopaedic surgeon evaluation and preferably an orthopaedic surgeon with an interest in foot injuries. A commonly missed severe injury of the foot is a disruption of the metatarsal tarsal and middle and medial cuneiform joints, which is associated with severe swelling. This will often have a normal X-ray and the diagnosis is missed.

All of these patients will require standing X-rays after a few days to show abnormal movement and splaying of the bones in the foot or MRI investigation. The minor lateral ligament injuries of the ankle will normally be strapped or put in an aircast brace and referred to physiotherapy. More severe lateral ligament injuries may require casting and are best referred to an orthopaedic surgeon. Problems seen at a later stage occur when there has been inadequate examination of the foot and no true commitment to a definite diagnosis.

The pain and swelling is treated by a physiotherapist, in the belief that this is a minor injury and will resolve itself. The diagnosis of a sprained foot needs to be made with extreme caution. Twenty-five% of Achilles injuries referred to an orthopaedic surgeon is initially missed by the first treating physician or physiotherapist. The displaced ankle fractures normally require internal fixation and this would imply that the rugby player would be off for 3-6 months. Complete lateral injury of the ankle can also keep a player out of rugby for a period of 3 months. Lisfranc injuries normally require surgical stabilisation unless they are sprains.

CONCLUSION

The assessment of the foot and ankle injury on the field and the decision made to remove a player is a lot easier than in the upper limb area, as any significant injury means that the player is unable to run and this therefore normally results in the removal of the player.

It is important that the player is referred on to a specialist and is assessed properly so that the important injuries are not missed. Furthermore, the ankle ligament injuries should be rehabilitated by the physiotherapist under supervision so that the player can return to rugby without having recurrent injuries.

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